SOUTH ATLANTIC DIVISION.

DELAWARE.

The northern portion of the state, comprising New Castle and Kent counties, was once covered with the deciduous forests of the Atlantic plain. Conifers, with the exception of the red cedar, were rare. In the sandy soil of the southern part of the state various pitch pines flourished, forming fully one-half of the forest growth. These pine forests were long ago consumed and are now replaced by a second growth, generally composed of the species which originally occupied the ground; and throughout the state the best hard-wood timber has been culled from the forest. Large quantities of wheel and cooperage stock were formerly manufactured in the northern counties; but of late years these and other industries using the products of the forest have, for want of material, generally decreased in importance. The manufacturers report a general scarcity of timber.

During the census year 3,305 acres of woodland were reported destroyed by fire, with a loss of $15,675. Of such fires six were set by locomotives, six by the careless burners of brush upon farms, and two through malice.

KENT COUNTY.—About one-quarter of this county is reported covered with forest. A few small mills saw oak from the immediate neighborhood into shipstuff and car lumber, shipping to Wilmington, Philadelphia, and even to New York.

NEW CASTLE COUNTY.—About one-quarter of this county is reported covered with woodland, mostly of second growth and attached to farms. The large establishments for the manufacture of gunpowder, located in the neighborhood of Wilmington, consume large amounts of willow wood, generally grown for the purpose upon farms in their immediate vicinity.

SUSSEX COUNTY.—One-third to one-half of this county is reported covered with woodland. Numerous small mills, obtaining their supply of logs from the immediate neighborhood, saw oak for shipstuff.

MARYLAND.

The northwestern portion of the state, crossed by the ridges of the Appalachian system, was once covered with the forests of white pine, hemlock, birch, and maple peculiar to this mountain region. The central portion of the state, extending from the mountains to the shores of Chesapeake bay, was covered with oaks, hickories, gums, and other deciduous trees in great variety, the eastern peninsula largely with different species of pitch pine, occupying sandy plains, or mixed with deciduous trees.

In the mountain region considerable bodies of the original forest remain upon the highest and most inaccessible slopes; in the remainder of the state this, where the land has not been permanently cleared for agriculture, is now largely replaced by a second growth, or—the best timber at least—has been everywhere culled.

A large amount of cooperage stock was formerly manufactured in this state. This industry has, however, greatly suffered from the deterioration and exhaustion of the local supply of timber; manufacturers report the best stock nearly exhausted and the substitution for oak, formerly exclusively used, of elm and other inferior woods now brought from beyond the limits of the state.

During the census year 41,076 acres of woodland were reported destroyed by forest fires, with a loss of $37,425. These fires were traced to the carelessness of hunters, to locomotives, and largely to the escape from farms to the forest of fires set in clearing land. The principal lumber manufacturing establishments using Maryland logs are situated in Garrett county; these saw white pine, hemlock, and oak to supply a limited local demand and ship to Baltimore, Philadelphia, Pittsburgh, and Wheeling; considerable oak timber is sent to Europe from this county. During the year 1879 the northern counties produced 176,076 pounds of maple sugar.

DISTRICT OF COLUMBIA.

The original forest has disappeared from the District of Columbia and has been replaced by a second and third growth of oaks, scrub pines, and other trees. The area occupied with woods is probably slowly increasing. A single saw-mill, situated in the city of Washington, saws logs grown beyond the limits of the District.

VIRGINIA.

The forests of Virginia, like those of the Carolinas and Georgia, fall naturally into three divisions, dependent upon the elevation and soil of the different parts of the state. The mountains and ridges of its western border are

covered with a heavy growth of pine, hemlock, white oak, cherry, yellow poplar, and other northern trees; over the region extending east of the mountains oaks, principally black oaks, once formed the prevailing forest growth; through these are now mingled long stretches of various pitch pines, occupying exhausted and barren soil once devoted to agriculture. The eastern counties are covered with the forests of the Maritime Pine Belt, generally confined to the Tertiary deposits of the coast and extending inland to the head of tide-water of the principal streams; along the western borders of this pine belt the forest growth is nearly equally divided between the pines and the broad-leaved species.

The inaccessible mountain region in the southwestern part of the state still contains immense quantities of the original oak, hickory, walnut, and cherry, the scanty population of these mountains having made but slight inroads upon the forests. Railroads have hardly penetrated them, while the streams which head here are unsuited to carry to market the hard woods of which this forest is largely composed. The most valuable hard-wood forest remaining on the continent exists in southwestern Virginia and the adjacent counties of West Virginia, Kentucky, Tennessee, and North Carolina. From the central and eastern portions of the state the original forest has almost entirely disappeared, and is now replaced by a second growth, in which the Jersey pine and the old-field pine are characteristic features, generally replacing more valuable species of the original growth.

During the census year 272,319 acres of woodland were reported ravaged by fire, with a loss of $326,944. Of such fires the largest number was traced to the careless burning of brush upon farms and to locomotives.

The manufacture of cooperage stock is increasing rapidly in the western part of the state, and great quantities of staves are exported thence directly to Europe, as well as oak, yellow poplar, and walnut in the log. The manufacture of tobacco cases from sycamore lumber is an important industry in the neighborhood of Lynchburg and other tobacco-distributing centers. Considerable quantities of hand-made shingles are produced in the cypress swamps which occupy a large portion of Norfolk and other eastern counties. A large amount of second-growth pine (*Pinus Tæda*) is shipped from the different Virginia ports by schooner to New York for fuel, and this second-growth pine furnishes the principal building material used throughout the state. The grinding of oak and sumach bark and the manufacture of tanning extracts are important and profitable industries of the state.

WEST VIRGINIA.

The forests of West Virginia, with the exception of the belt of pine and spruce confined to the high ridges of the Alleghany mountains, are principally composed of broad-leaved trees, the most important of which are the white and chestnut oaks, the black walnut, the yellow poplar, and the cherry. The white pine and spruce forests reach within the state their southern limit as important sources of lumber supply.

The forests have been largely removed from the counties bordering the Ohio river, and the most valuable hard-wood timber adjacent to the pricipal streams, especially black walnut, cherry, and yellow poplar, has been culled in nearly every part of the state. But slight inroads, however, have yet been made into the magnificent body of hard-wood timber covering the extreme southern counties, which still contain vast quantities of oak, cherry, and poplar.

The black walnut found scattered everywhere in West Virginia is least plentiful in the northwestern and Ohio River counties, and most abundant along the upper waters of the rivers flowing into the Ohio through the southwestern part of the state. Yellow poplar is found throughout the state, and is still abundant about the headwaters of nearly all the principal streams. Large bodies of cherry are found in Greenbrier, Nicholas, Webster, and other counties immediately west of the mountains, and a large amount of hemlock is scattered through the valleys and ravines of the northeastern part of the state and along the western slopes of the Alleghanies. The area still occupied by white pine is estimated to extend over 310 square miles, and to contain about 990,000,000 feet of merchantable lumber. The principal centers of lumber manufacture are along the Kanawha river at Ronceverte, in Greenbrier county, at Parkersburg, and along the upper Potomac.

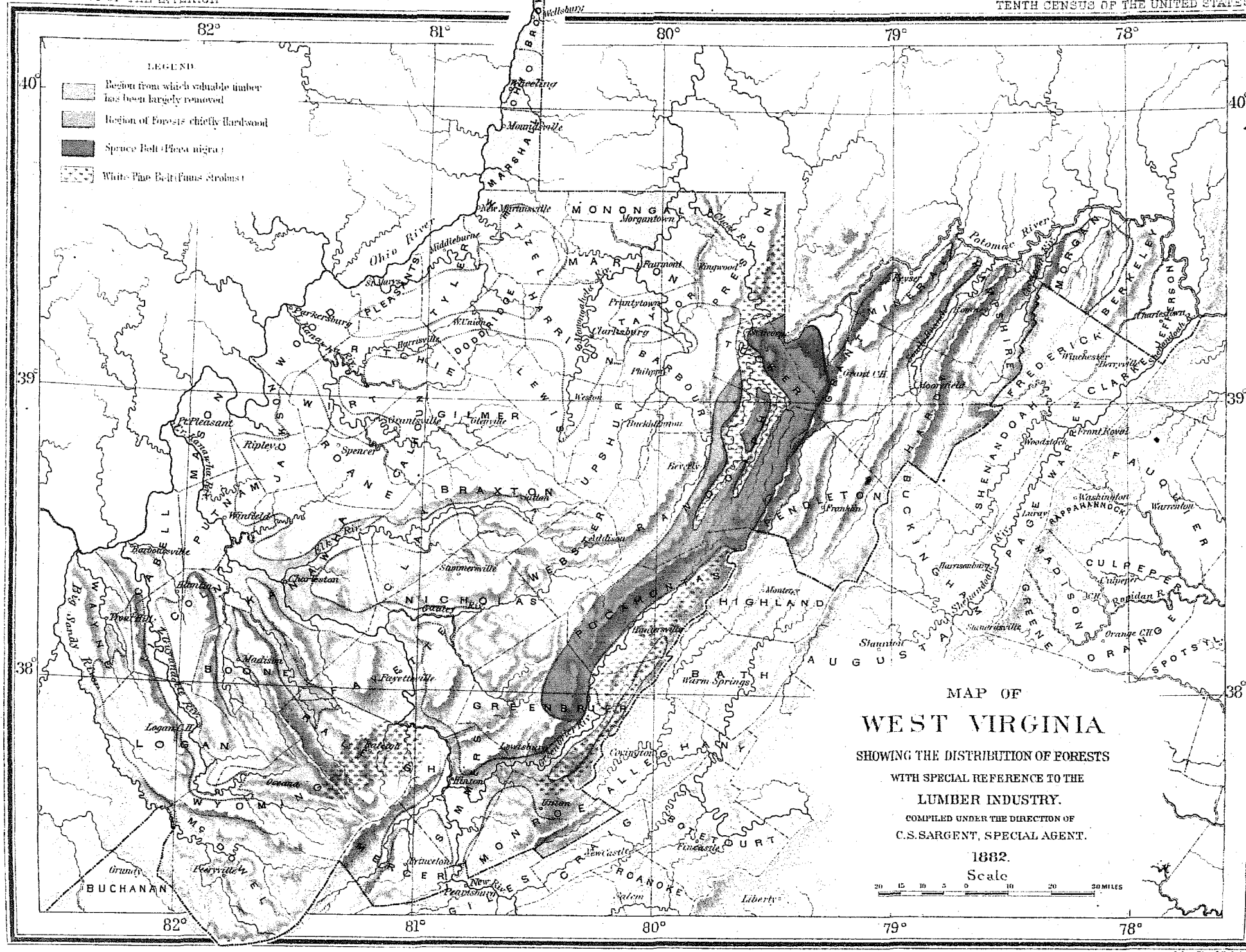
Partial returns of the hoop-pole industry gave a product during the census year of 3,549,000, valued at $146,000.

During the census year 476,775 acres of woods were reported destroyed by fire, with a loss of $155,280. Of these fires the largest number was traced to the careless clearing of land for agricultural purposes, although many had their origin in sparks from locomotives.

The manufacture of cooperage stock is fast increasing in importance, and seems destined, with the exhaustion of the more accessible hard-wood forests of the country, to assume a much greater development than at present Large quantities of black walnut, yellow poplar, and oak in the log are shipped to northern markets and to Europe.

The following notes upon the forests of West Virginia are extracted from Mr. Pringle's report:

"Entering West Virginia at Keyser (New Creek) by way of Cumberland, Maryland, we find ourselves in one of the narrow valleys lying among the low abrupt ridges of the northern Alleghanies, among which we have been traveling since we reached the vicinity of Williamsport, Pennsylvania. Coming south from middle Pennsylvania, however, the forest growth covering the long mountain chains within view from the railroad becomes heavier and heavier, the evidences of fire and ax largely disappearing. On the hills above Keyser fewer evergreens appeared than I had previously seen. A few slopes were principally occupied by pine in variety, but the mountains of this



Julius Bien & Co. lith.

region were covered with a growth of deciduous trees, white, black, red, Spanish, and chestnut oaks, hickories, butternuts, black walnuts, yellow poplars, locusts, elms, sugar maples, etc. At Piedmont some $200,000 have been expended in the construction of a boom on the North Branch of the Potomac. At this point, as well as at Swanton and Deer Park, on the Maryland side, there are mills sawing chiefly white oak, and also considerable white pine, spruce, hemlock, poplar, white ash, etc. Some spruce which had not been seen or heard of in the timber belt of Pennsylvania is found 20 miles above Piedmont. The market for lumber manufactured here is chiefly eastward. Much of the oak is sent to Europe, partly in the form of squared timber, partly cut 5 by 12 inches and from 15 to 20 feet long. The mills at Swanton and Deer Park are located on the railroad, and cut timber is hauled to them from the vicinity. The mills at Piedmont are fed by logs driven down the river from the western portions of Mineral and Grant counties, West Virginia. This lumber is chiefly oak, spruce, and hemlock. Great difficulty is experienced in driving this part of the Potomac, as it is a swift and rocky stream. Logs, especially oak, constantly lodge on the rocks or banks, and there has been great difficulty in maintaining the boom and dam at this point.

"Rowlesburg, in Preston county, owes its existence as a lumber depot to the fact that the Cheat river, upon which it is situated, as it passes through the Briery mountains, for a distance of 25 miles below this point has so narrow and rocky a channel and so swift a current that it is not possible to get the logs farther down the stream. Above Rowlesburg the Cheat river is a good stream to drive, and any one of its branches can be driven from a point 125 miles above that point. From the mouth of the Black Fork, 30 miles above, the timber is brought down in rafts rather than as separate logs; this is because there is no boom as yet at Rowlesburg to stop the logs. There are small booms on Black and Shaver's Forks, many miles above Rowlesburg. Scattered along the river at some distance above Rowlesburg there are a few small mills, the product of which is floated down the stream on rafts. The timber of Preston county between Rowlesburg and the vicinity of the mouth of the river is oak, poplar, chestnut, ash, beech, yellow beech, hemlock, basswood, and hickory.

"The timber of Canaan valley, in Tucker and Randolph counties, is largely hemlock on the lower lands, on the higher situations and slopes sugar maple and beech; and, as soon as a suitable elevation is reached, spruce is mingled with black cherry. In other portions of Tucker county and on the tributaries of the Cheat river, flowing out of Randolph county, the timber is chiefly oak, poplar, ash, spruce, cherry, black walnut, white pine, etc. This, however, is not a black-walnut region, and there are here nowhere more than scattered trees; a careful search has failed to find any great body of this timber here. It is estimated that 2,500,000,000 feet of yellow poplar are still standing in the valleys of the Cheat and its tributaries.

"Shaver's Fork is heavily timbered with spruce. A boom has been constructed at Grafton, on Tygart's Valley river, a main branch of the Monongahela. It is a rough stream, unfavorable for lumber operations, and for a distance only of 10 miles above Grafton is smooth enough to admit of the passage of rafts. All lumber has, therefore, to come down in separate logs, and only such kinds as are light enough to float well can be got down. For this reason there is very little except poplar sawed at Grafton. Oak is too heavy to be driven successfully, and as it cannot be tied up in rafts with poplar, as is done on the Cheat, the stores of oak timber growing in the valleys drained by this river must wait the building of a railroad to bring them to market. The yellow poplar still standing in this region is estimated at 300,000,000 feet, and on the higher grounds, especially about the headwaters of streams, there are fine bodies of black cherry mixed with other trees.

"At Parkersburg are located the mill and shops of the Parkersburg Mill Company, situated on the banks of the Little Kanawha, a short distance above its confluence with the Ohio. This is the only company operating in lumber within the city of Parkersburg. It manufactures about 6,000,000 feet of lumber annually, mostly poplar, some oak, and about a quarter of a million feet of beech. Little black walnut can now be obtained here, and that of inferior quality. Rough lumber and manufactured articles of wood find a market in nearly every direction, west, north, and east. I was astonished and delighted to see how closely the lumber was worked up and the great variety of articles manufactured from slabs, edgings, culls, etc., which in other mills are so generally thrown into the waste pile. Broom handles, corn-popper handles, brush handles, brush heads, tool handles of many descriptions, and fly-trap bottoms are but a few of the articles which are turned out by millions from odd bits of wood, few of which are too small to make something or other from. The company executes orders for articles used in manufactories widely distributed over the country from Cincinnati and Chicago to Boston and New York. Poplar is used for broom handles, and beech, maple, sycamore, black walnut, cherry, etc., for smaller articles. This company does not own and operate timber lands, but buys its logs from parties who deliver rafts to its mill. Formerly much lumber was wasted in this region in clearing lands for farms, but now proprietors of land find it to their advantage to cut and save their logs, which they bring down in rafts themselves or sell to parties who make a business of rafting. Once out of the small streams, the logs are easily rafted down the Little Kanawha during favorable seasons.

"There are no booms on the Little Kanawha, except temporary constructions for special purposes, which are broken up by every flood. Several years ago it was supposed that the timber on this river was nearly exhausted, but it continues to come down in undiminished quantities to the value of some hundred thousand dollars annually, in addition to railroad ties, staves, etc. It is only about 40 miles up the main river, and to no great distance back from the stream, that the supply of oak is exhausted. The river is a hundred miles long, and about its upper

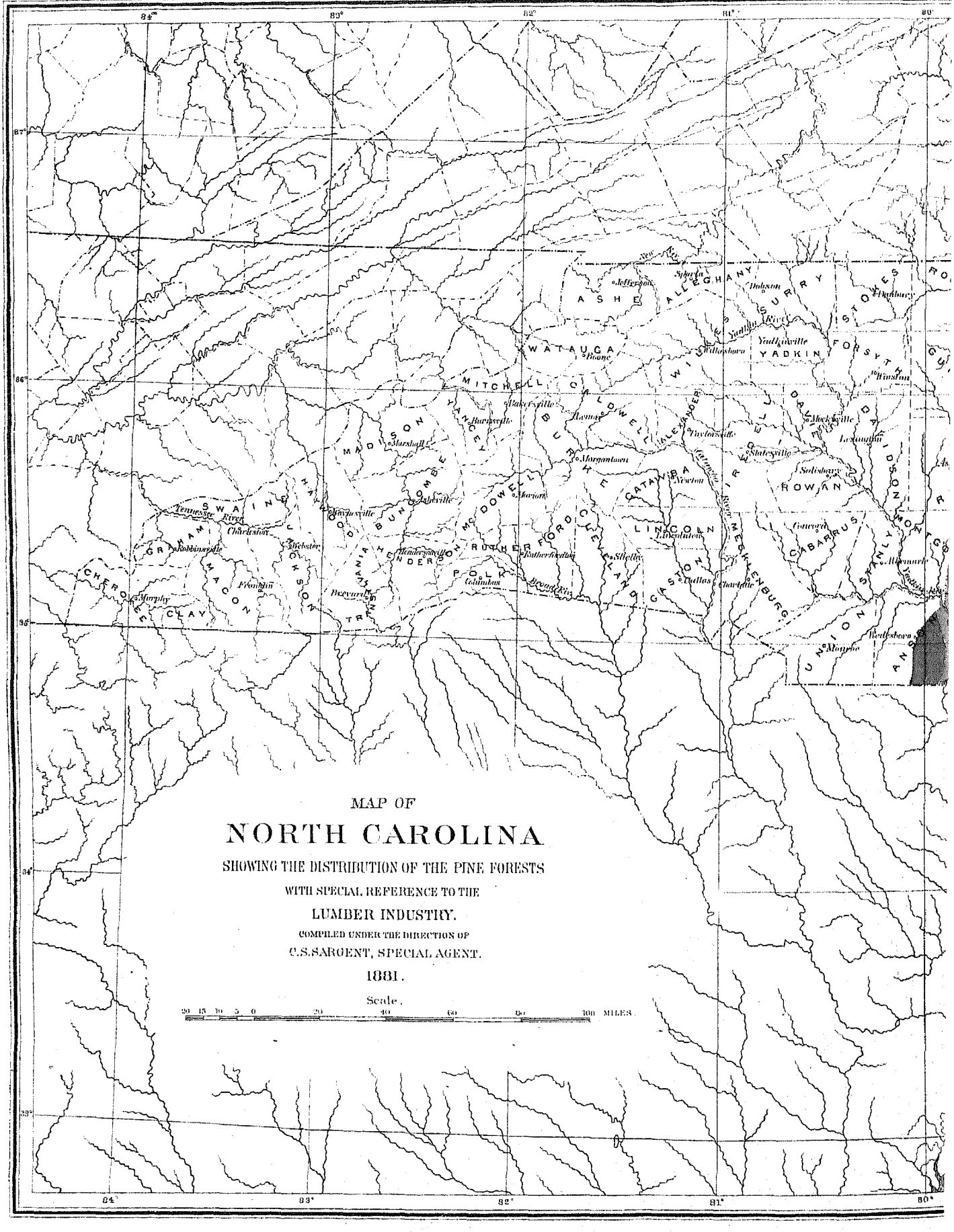
waters and those of its tributaries the oak is comparatively untouched. Much of Wirt county and the greater part of Roane, Calhoun, and Gilmer, in the upper part of the valley of the Little Kanawha, are a vast virgin forest of oak and poplar, containing a good deal of black walnut and sugar maple and some black cherry. Baxter county is magnificently timbered, as is Webster, although the timber here is yet inaccessible.

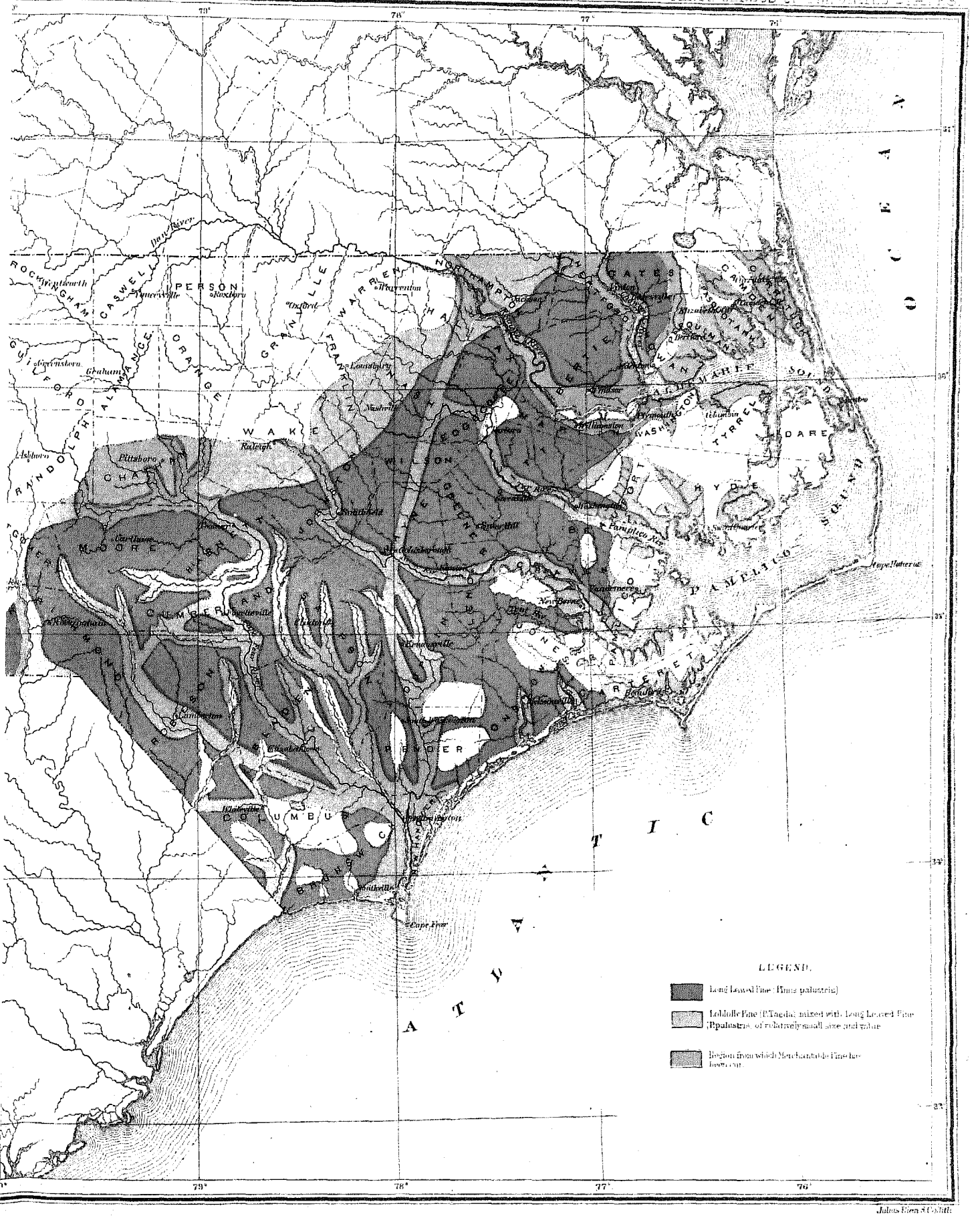
"The Guyandotte is a good river for lumbering operations. Rafts can come down from a point 100 miles from its mouth. There are yet no booms on this river, except strings of logs occasionally stretched across it for temporary purposes. On its course above Guyandotte are four or five mills, doing for the most part a local business, their product for export being only about 1,000,000 feet of sawed lumber. The rafting of this sawed lumber is attended with some risk of loss, and therefore a much greater amount is brought down in unsawed logs bound together in rafts, which are taken down the Ohio and sold to various mills along its course. These rafts are usually made 11 logs wide, and three or four of these courses are placed end to end. White oak is made up into rafts with a poplar log in the center of each course, and thus the raft is made light enough to float easily. Along the Guyandotte, in the lower part of its course, the oak and poplar have been cut for a distance of from 1 mile to 2 miles from the stream, the black walnut for some 5 miles back; but nine-tenths of the area drained by this river is still in original forest, composed of white, chestnut, and other oaks, poplar, walnut, several hickories, beech, sugar maples, sycamore, ash, etc. In this region there is, in the aggregate, a good deal of black walnut, but it exists as scattered trees rather than in groves or tracts.

"Coal river is 160 miles long, and for 36 miles, or to Peytona, is navigable for barges. The valley of this river is covered with truly magnificent forests, in which the trees of the several species composing them attain remarkable dimensions. Poplar and white oak here exist in nearly equal proportions, and together constitute about a third of the timber. Besides these there is a good deal of black cherry, lin, and locust, as well as hemlock, the latter not being considered valuable in this country. Black walnut appears more abundant in this region than in any other of similar extent of which I have yet heard. But little timber has yet been removed from the valley of this river, and it is chiefly the lower portion and the immediate vicinity of the banks which have been lumbered.

"The Elk river empties into the Kanawha at Charleston. About 2 miles above its mouth are located a boom and several saw-mills, and here are also a dam and lock which secure slack-water for some 20 miles. The river is about 180 miles in length; logs have been driven from a pc'nt 150 miles above its mouth, but its valley has only been lumbered to any great extent in the immediate vicinity of the main river, and to a distance of some 110 miles from its mouth. Most of the original growth of the forest of the Elk basin still remains, and is composed largely of white oak, hickory, chestnut, and poplar. Black walnut here, as everywhere else in this state, is scattered, although it is estimated that 10,000,000 feet of this lumber still remain in this region. Above a certain altitude and about the upper waters of this river considerable black cherry, sugar maple, and birch is found. Here also beech and basswood abound, by the streams hemlock o curs, and on the mountains a little black spruce. About the upper settlements on this river miles of fence co' ructed with boards of black cherry and farms fenced with black-walnut rails may be seen. Formerly large nur bers of coal-boats and salt-boats were built upon the Elk river. Once, also, the salt-works of the Kanawha req ed vast numbers of barrels; these were made of black as well as white oak; now but five of the sixty furnaces nce boiling brine in this vicinity are in operation, and there is little demand for black oak for staves. The country along the Kanawha between the Elk and the Gauley rivers has been lumbered for 5 or 6 miles back from the streams, and about one-fourth of the timber has been cut from these valleys. The Gauley river with its several large tributaries drains a valley which covers nearly 5,000 square miles; its length is about 110 miles, much less than that of the Elk, which is a long, slender stream, but it occupies a much broader valley and has twice the volume of water of the Elk. Unlike the rivers just considered, which wear out for themselves smooth channels through the soft sandstone, the Gauley is a rough stream, tumbling rapidly over hard conglomerate rock, its bed being full of bowlders and ledges. For the first 10 miles from its mouth the fall averages 4 feet to the mile; above that 20 feet to the mile, while its upper waters are so swift and rough as to be unnavigable even for small boats. For these reasons the Gauley does not admit of the passing of rafts, and it is a difficult river upon which even to drive single logs. Its valley is but little settled, except on Meadow river and along its right bank below that stream. Above a point 15 miles from its mouth no timber has been touched except by the few settlers. In the lower part of the valley of the Gauley for 15 or more miles the timber is chiefly oak, poplar, walnut, etc. The Gauley and its large affluents, the Cherry, Cranberry, and Williams rivers, all head back in the forests of black spruce, which sometimes take entire possession of the mountain tops; a little lower, yet often mingled with the spruce, hemlocks and black cherry abound. On Cherry river the cherry trees so predominate over all others as to have given their name to the stream. Here are trees often 4 feet in diameter. The region intermediate between the upper and the lower districts of the Gauley thus described contains much beech, sugar maple, and black cherry. The white oak which abounds in the lower basin of this river disappears above an altitude of 2,000 feet. I was informed that, although lumbering operations were but lately begun on the Gauley, nearly 1,000,000 feet of poplar were brought out of the river in 1879, and that it had yielded 50,000 feet of black walnut in 1880, while there were now in the river poplar logs enough to make 3,000,000 feet of lumber. About one-fourth of the cut of late years has been sawed at mills near the falls; the rest is rafted to Charleston.

DEPARTMENT OF THE INTERIOR





Julius Bien & Co. lith.

"The valley of the New river is only lumbered for from 3 to 5 miles from the stream, although the walnut has been gathered 10 miles farther back. This is a rough country in which to lumber, since the streams cut deep into the earth, and New river cannot be driven.

"Ronceverte is situated on the Greenbrier river at the point where the Chesapeake and Ohio railroad first meets this stream as it descends from the Alleghany mountains. Here is the boom of the Saint Lawrence Boom Company, and here are located three or four lumber firms operating steam-mills. One of these, the New York Hoop Company, uses two million hoop-poles per annum, chiefly hickory, manufacturing hoops for flour barrrels, pork barrels, hogsheads, and tierces, besides strips for boxes, etc. The process of manufacturing hoops was explained to me as follows: The poles, of assorted lengths and sizes, are passed through machines which split each of them into two, three, or four pieces, and these are put through other machines which plane flat the inner side of each strip, leaving the bark intact. The hoops thus made are tied into bundles and shipped to New York.

"The Greenbrier river rises in the limestone sinks in Randolph county, whence it flows southwesterly through the fertile limestone valley between the Alleghany and the Greenbrier mountains for a distance of 120 miles, emptying into the New river at Hinton. Flowing through such a valley it is not a rapid stream, but from a point 12 miles below Travelers' Rest, on its headwaters, it is fine for rafting. Yet the stream needs some improvement, especially by the closing up of back channels into which the logs are borne by high water, to be left in swamps when the flood recedes.

"Only a small proportion of the timber of the Greenbrier river has been removed as yet, and it is estimated that in its valley white oak, white pine, poplar, cherry, hemlock, walnut, and ash enough remain to make 1,000,000,000 feet of boards, and that there are not less than 500,000,000 feet of white pine in this region, occupying a belt through the center of both Greenbrier and Pocahontas counties. The eastern limit of the black-spruce belt on the headwaters of the Elk and Gauley rivers, the most extensive and valuable in West Virginia, coincides with the western limits of the white-pine belt lying in Pocahontas county. Its southern line runs northwesterly from the south end of Pocahontas to near the center of Nicholas county. From this point its western line runs northeasterly through the center of Webster county to the vicinity of Huttonville, in Randolph county, the northern end of the belt covering the upper waters of Shaver's Fork of the Cheat river. Over this belt black spruce is scattered more or less densely, sometimes occupying almost exclusively the high slopes, particularly the northern slopes and the summits of the mountains.

"It is believed that 10,000,000 feet of black walnut, in paying quantities, could still be gathered in this part of the state, and that there would then be left an equal amount so scattered that it could not be profitably collected at present prices."

NORTH CAROLINA.

The forests of North Carolina were once hardly surpassed in variety and importance by those of any other part of the United States. The coast region was occupied by the coniferous forests of the southern Maritime Pine Belt; the middle districts of the state by a forest of oaks and other hard-wood trees, through which the old-field pine is now rapidly spreading over worn-out and abandoned farming lands. The high ridges and deep valleys of the Appalachian system which culminate in the western part of the state are still everywhere covered with dense forests of the most valuable hard-wood trees mingled with northern pines and hemlocks. The inaccessibility of this mountain region has protected these valuable forests up to the present time, and few inroads have yet been made into their stores of oak, cherry, yellow poplar, and walnut. The hard-wood forests of the middle districts, however, have been largely removed or culled of their finest timber, although the area of woodland in this part of the state is now increasing. These new forests, usually composed of inferior pine, are of little economic value, except as a source of abundant fuel and as a means of restoring fertility to the soil, preparing it to produce again more valuable crops. A larger proportion of the pine forest of the coast has been destroyed in North Carolina than in the other southern states. This part of the state has long been the seat of important lumbering operations, while the manufacture of naval stores, once almost exclusively confined to North Carolina, and always an important industry here, has seriously injured these forests. The original forests have been practically removed from the northeastern part of the state, the great region watered by the numerous streams flowing into Albemarle and Pamlico sounds; and although some lumber, largely second-growth pine trees of poor quality, is produced here, the importance of these forests is not great. The merchantable pine, too, has been removed from the banks of the Cape Fear and other rivers flowing through the southern part of the state, and although these streams still yield annually a large number of logs, they are only procured at a constantly increasing distance from their banks and with a consequent increasing cost for transport.

Forest fires inflict serious damage upon the pine forests of the south. During the census year 546,102 acres of woodland were reported destroyed by forest fires, with a loss of $357,980. The largest number of these fires were traced to the carelessness of farmers in clearing land, to locomotives, hunters, and to malice.

Manufacturers of cooperage and wheel stock, industries which once flourished in the eastern and central portions of the state, already suffer from the exhaustion and deterioration of material. Such industries, however, are increasing in the extreme western counties, and promise to attain there an important development.

The following estimate, by counties, of the merchantable pine standing May 31, 1880, south of the Neuse river, the only part of the state where it is of commercial importance, was prepared by Mr. Edward Kidder, of Wilmington. It is based upon actual surveys and the reports of a large number of timber-land experts familiar with the different counties still occupied by the forests of long-leaved pine:

LONG-LEAVED PINE (*Pinus palustris*).

Counties.	Feet, board measure.
Bladen	288, 000, 000
Brunswick	141, 000, 000
Chatham	448, 000, 000
Columbus	288, 000, 000
Cumberland	806, 000, 000
Duplin	21, 000, 000
Harnett	486, 000, 000
Johnston	563, 000, 000
Moore	504, 000, 000
New Hanover	96, 000, 000
Onslow	34, 000, 000
Robeson	864, 000, 000
Sampson	602, 000, 000
Wake	48, 000, 000
Wayne	40, 000, 000
Total	5, 229, 000, 000
Cut for the census year ending May 31, 1880, exclusive of 59,190,000 feet cut in the counties adjacent to Albemarle and Pamlico sounds and along the Pamlico and Neuse rivers, which is largely loblolly pine (*Pinus Tæda*).	108, 411, 000

NAVAL STORES.

Small quantities of crude turpentine were produced upon the coast of North Carolina, between the Pamlico and Cape Fear rivers, soon after the earliest settlement of the country. It was sent to Great Britain or converted into spirits of turpentine and rosin for home consumption. The demand for ships' stores had greatly increased the North Carolina production as early as 1818, although the field of operations was not extended south of the Cape Fear river, nor more than 100 miles from the coast, until 1836. The large demand for spirits of turpentine created during that year induced manufacturers to test the yield of trees on the west side of the Cape Fear river, up to that time considered unproductive. The result was satisfactory, although overproduction and low prices deferred until 1840 the development of this region. Since 1840 this industry has been gradually carried southward. Naval stores were produced in South Carolina in 1840, and in Georgia two years later. Turpentine orchards were established in Florida and Alabama in 1855, and more recently in Mississippi and eastern Louisiana.

The naval stores manufactured in the United States are principally produced from the resinous exudations of the long-leaved pine (*Pinus palustris*), and in small quantities from the loblolly pine (*Pinus Tæda*), and the slash pine (*Pinus Cubensis*) of the Florida coast. The trees selected for "boxing" are usually from 12 to 18 inches in diameter, although trees with trunks only 8 inches through are now sometimes worked. A deep cut or "box" is made in the trunk of the tree, by a cut slanting downward, some 7 inches in depth, and generally 12 inches above the ground, and met by a second cut started 10 inches above the first and running down from the bark to meet it. In this manner a segment is removed from the trunk and a triangular trough formed 4 inches deep and 4 inches wide at the top.

Two such boxes, or upon a large trunk sometimes four, are made on each tree. A "crop", the unit of production among large operators, consists of 10,000 such boxes. The boxes are cut early in November with a narrow-bladed ax specially manufactured for the purpose, and the trees are worked on an average during thirty-two weeks. As soon as the upper surface of the box ceases to exude freely, it is "hacked" over and a fresh surface exposed, the dried resin adhering to the cut having been first carefully removed with a sharp, narrow, steel scraper. The boxes, especially after the first season, are often hacked as often as once a week, and are thus gradually extended upward until upon trees which have been worked during a number of seasons the upper surface of the box is often 10 or 12 feet above the ground. For these long boxes the scraper is attached to a wooden handle, generally loaded with iron at the lower end to facilitate the operation of drawing down the resin. Once in four weeks, or often less frequently, the resin caught in the bottom of the box is removed into a bucket with a small, sharp, oval steel spade attached to a short wooden handle. The product of these "dippings", as this operation is called, is placed in barrels and transported to the distillery. The first season a turpentine orchard is worked boxes are usually dipped eight times, yielding an average of 300 barrels of turpentine to the crop. The second year the

number of dippings is reduced to five, the product falling off to 150 barrels, while for the third season 100 barrels are considered a fair yield from three dippings. To this must be added the yield of the "scrapes", which for the first year is estimated, for one crop, at from 60 to 70 barrels of 280 pounds each, and for succeeding years at 100 barrels.

Trees can be profitably worked in North Carolina by experienced operators during four or five years, or, upon a small scale, in connection with farming operations and by actual residents, several years longer; farther south the trees seem to possess less recuperative power, and in South Carolina four years is given as the outside limit during which an orchard can be profitably worked, while in Georgia, Florida, and Alabama they are often abandoned at the end of the second and always at the end of the third year. Twenty-five men, including overseers, wagoners, distillers, coopers, and laborers can work ten crops. The average wages of such a force is $1 a day per man, so that the cost of labor necessary to work a crop during the season of thirty-two weeks is $480.

The following grades of turpentine are recognized in the trade: "Virgin dip", or "Soft white gum turpentine"—the product the first year the trees are worked; "Yellow dip"—the product of the second and succeeding years, and becoming darker colored and less liquid every year; "Scrape" or "Hard turpentine"—the product of the scrapings of the boxes.

Rosin is graded as follows: "W"—Window-glass; "N"—Extra pale; "M"—Pale; "K"—Low pale; "I"—Good No. 1; "H"—No. 1; "G"—Low No. 1; "F"—Good No. 2; "E"—No. 2; "D"—Good strain; "C"—Strain; "B"—Common strain; "A"—Black.

Window-glass is the lightest grade, and is only produced from the first dippings of "virgin" trees—that is, trees worked for the first time. The resinous exudation becomes darker colored and less volatile every year, as the box grows older, and the rosin produced is darker and less valuable. Trees worked during several years produce a very dark brown or black rosin. Spirits of turpentine made from virgin trees is light colored, light in weight, and free from any taste; the resinous matter yielded in succeeding years gains more and more body, and the additional heat required in distilling it throws off some resin combined with the spirits, producing in it a strong, biting taste and greater weight.

Tar, produced by burning the dead wood and most resinous parts of the long-leaved pine in covered kilns, is graded as follows: "Rope yellow", or Ropemakers' tar—the highest grade, produced with a minimum of heat from the most resinous parts of the wood; "Roany," or "Ship smearing"—the next running of the kiln; "Black" or "Thin"—the lowest grade, made from inferior wood, or the last running of the kiln, and therefore produced with the maximum of heat.

The following statistics of the production of naval stores during the census year were prepared by Mr. A. H. Van Bokkelen, of Wilmington, North Carolina, to whom I am indebted for much information in regard to the methods used in carrying on this industry:

States.	Turpentine.	Rosin.
	Gallons.	*Barrels.*
Alabama	2,005,000	158,482
Florida	1,030,350	68,281
Georgia	3,151,500	277,500
Louisiana	250,000	20,000
Mississippi	250,000	20,000
North Carolina	6,279,200	663,967
South Carolina	4,593,200	333,940
Total	17,565,250	1,542,170

Eighty thousand barrels of tar were manufactured during the census year in North Carolina, and 10,000 barrels in the other southern states.

The total value of this crop of naval stores at centers of distribution, and of course including freight from the forest and different brokerage charges, was not far from $8,000,000. The net profits of the industry, even in the case of virgin trees, is very small, and at present prices is believed to be unprofitable except to the most skillful operators. The low price of southern timber-lands and the facility with which rights to operate tracts of forest for turpentine have been lately obtainable in several states have unnaturally stimulated production. The result of this has been that manufacturers, unable to make a profit except from virgin trees, abandon their orchards after one or two years' working and seek new fields of operation; the ratio of virgin forest to the total area worked over in the production of naval stores is therefore constantly increasing. It is estimated by Mr. Van Bokkelen that during the years between 1870 and 1880 an average of one-third of the total annual product of the country was obtained from virgin trees, and that in 1880 one-fourth of the crop was thus produced, necessitating the boxing in that year of the best trees upon 600,000 acres of forest. The production of naval stores is carried on in a wasteful, extravagant manner, and the net profits derived from the business are entirely out of proportion to the damage which it inflicts upon the forests of the country; the injury is enormous. Lumber made from trees

previously worked for turpentine is of inferior quality, although it is probably less injured than has been generally supposed. Comparatively few trees, however, once boxed are manufactured into lumber. It is estimated that 20 per cent. of them, weakened by the deep gashes inflicted upon their trunks, sooner or later are blown down and ruined; fires, too, every year destroy vast areas of the turpentine orchards, in spite of the care taken by operators to prevent their spread. It is customary in the winter, in order to prevent the fires which annually run through the forests of the Southern Pine Belt from spreading to the boxes, to "racket" the trees; that is, to remove all combustible material for a distance of 3 feet around the base of each boxed tree. Fire, carefully watched, has then been set to the dry grass between the trees, in order to prevent the spread of accidental conflagrations, and to give the box-choppers a firmer foothold than would be offered by the dry and slippery pine leaves. In spite of these precautions, however, turpentine orchards, especially when abandoned, are often destroyed by fire. The surface of the box, thickly covered with a most inflammable material, is easily ignited, and a fire once started in this way may rage over thousands of acres before its fury can be checked.

The manufacture of naval stores, then, decreases the value of the boxed tree for lumber, reduces the ability of the tree to withstand the force of gales, and enormously increases the danger to the forest of total destruction by fire.

Wilmington, the most important distributing point for this industry in the United States, handles 80 per cent. of all the naval stores manufactured in North Carolina. Previous to 1870 Swansboro', Washington, and New Berne were also large shipping points.

SOUTH CAROLINA.

The forest covering of South Carolina resembles in its general features that of the states immediately north and south of it. The pine forest of the coast, nearly coinciding in area with that of the Tertiary deposits, covers the eastern portion for a distance of 150 miles from the coast. The middle districts are occupied with hard-wood forests, or forests in which pines of various species are mixed with oaks, hickories, and other deciduous trees. The forests of the Alleghanies, rich in species and magnificent in the development of individual trees, spread over the mountains and valleys, which occupy the extreme western part of the state. The streams which flow through the Coast Pine Belt, often bordered by wide, deep swamps, are ill-suited to lumber operations, and less serious inroads have therefore been made into the pine forests of South Carolina than into those of North Carolina or Georgia. The merchantable pine, however, has been removed from the immediate neighborhood of the coast, from the banks of the Little Pedee river, and from along the lines of railroad.

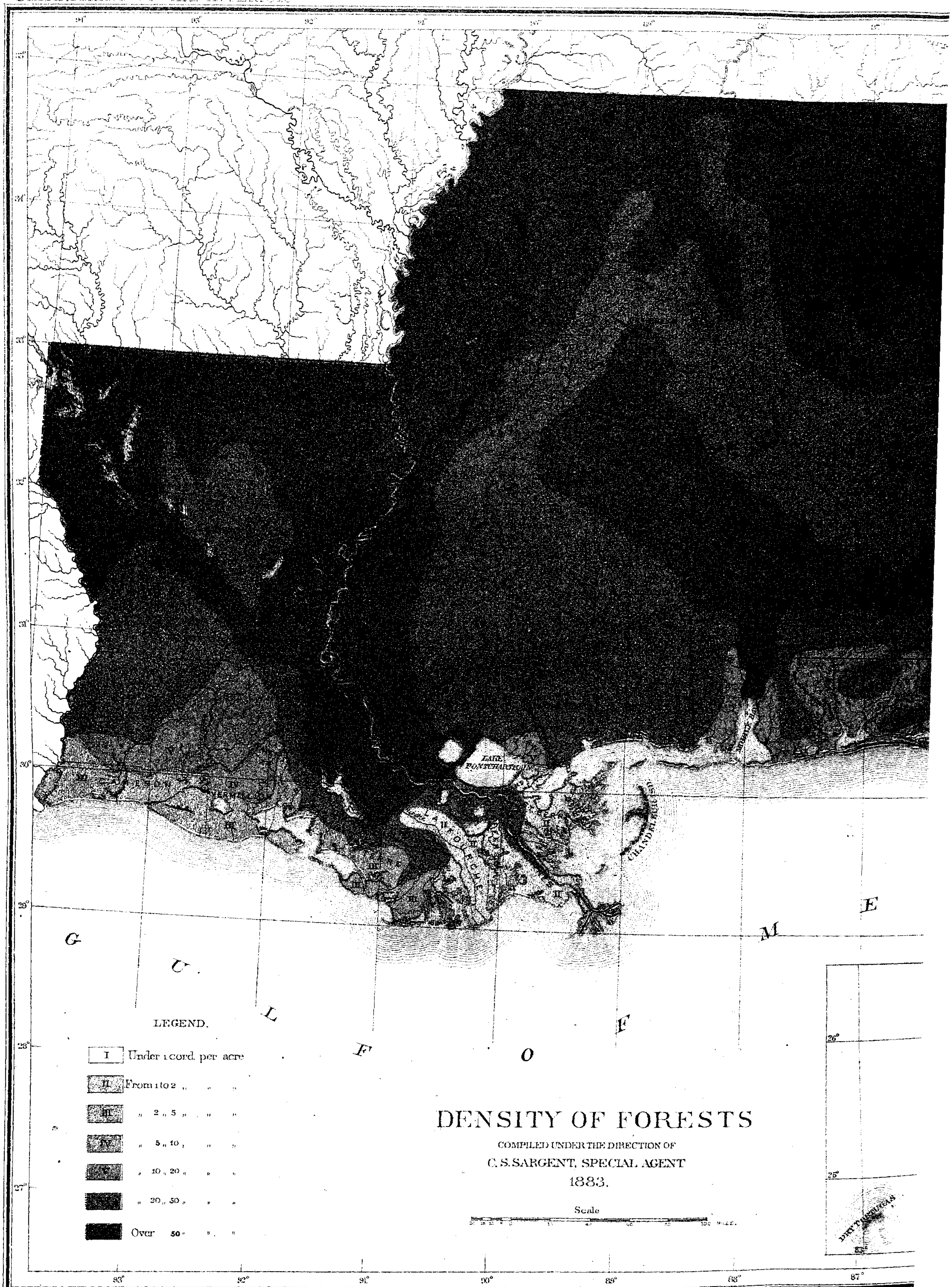
The most accessible hard-wood timber has been cut from the forests of the middle districts, although vast quantities still remain remote from railroads or protected in deep river swamps, inaccessible except during a few months of summer. The western counties still contain great bodies of hard-wood timber, yet undisturbed except to supply the wants of the scattered population inhabiting this almost inaccessible mountain region.

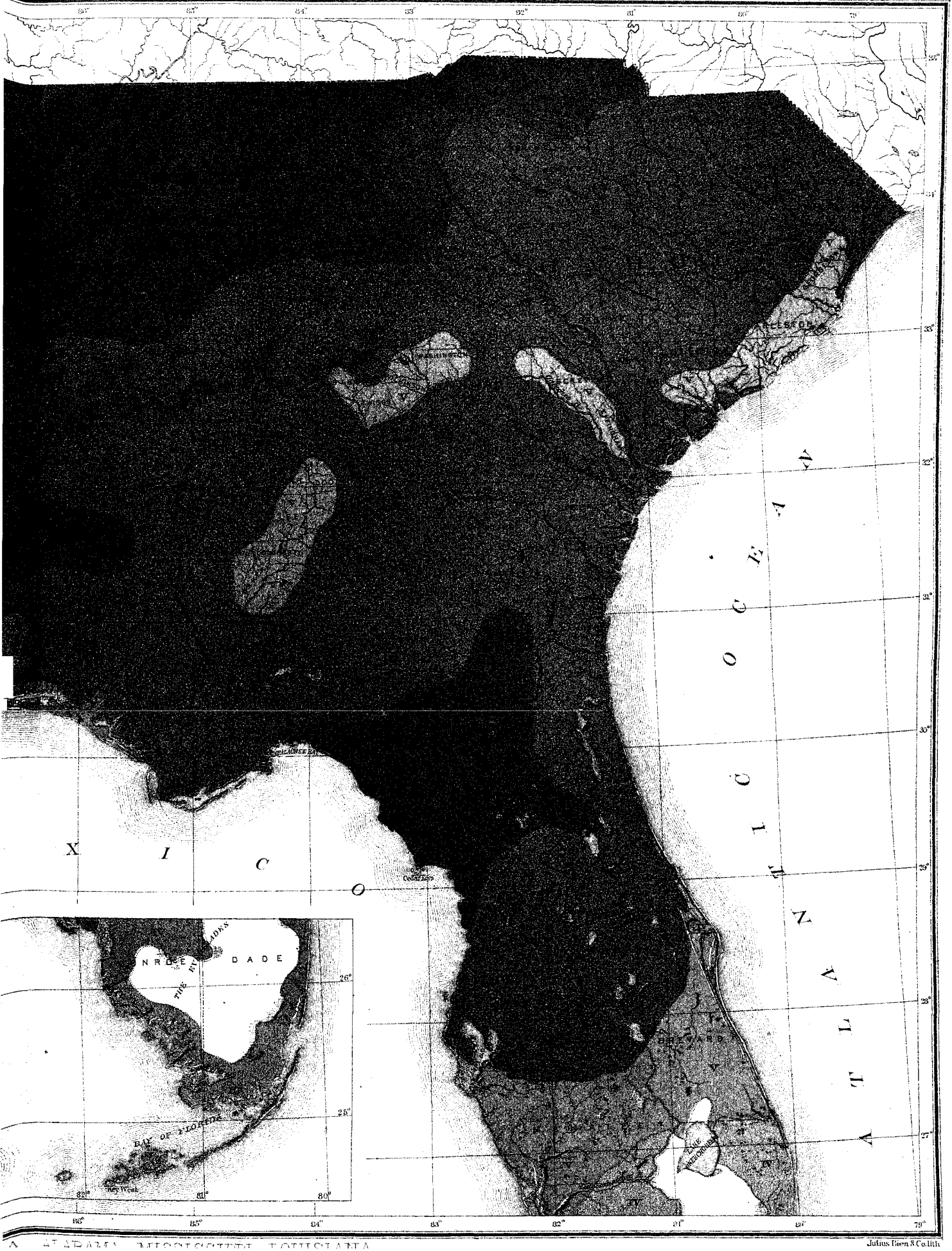
The manufacture of rough red and white oak split staves and headings for the European and West Indian trade, already an important industry in this state, is capable of large development; rice tierces and rosin barrels are also largely made in the coast region from pine. At Plantersville, in Georgetown county, and at other points along the coast quantities of hand-made cypress shingles are manufactured in the swamps.

During the census year 431,730 acres of woodland were reported destroyed by forest fires, with a loss of $291,225. These fires were set by careless hunters, by the careless burning of brush upon farms, and by sparks from locomotives.

BURNING OFF DEAD HERBAGE.

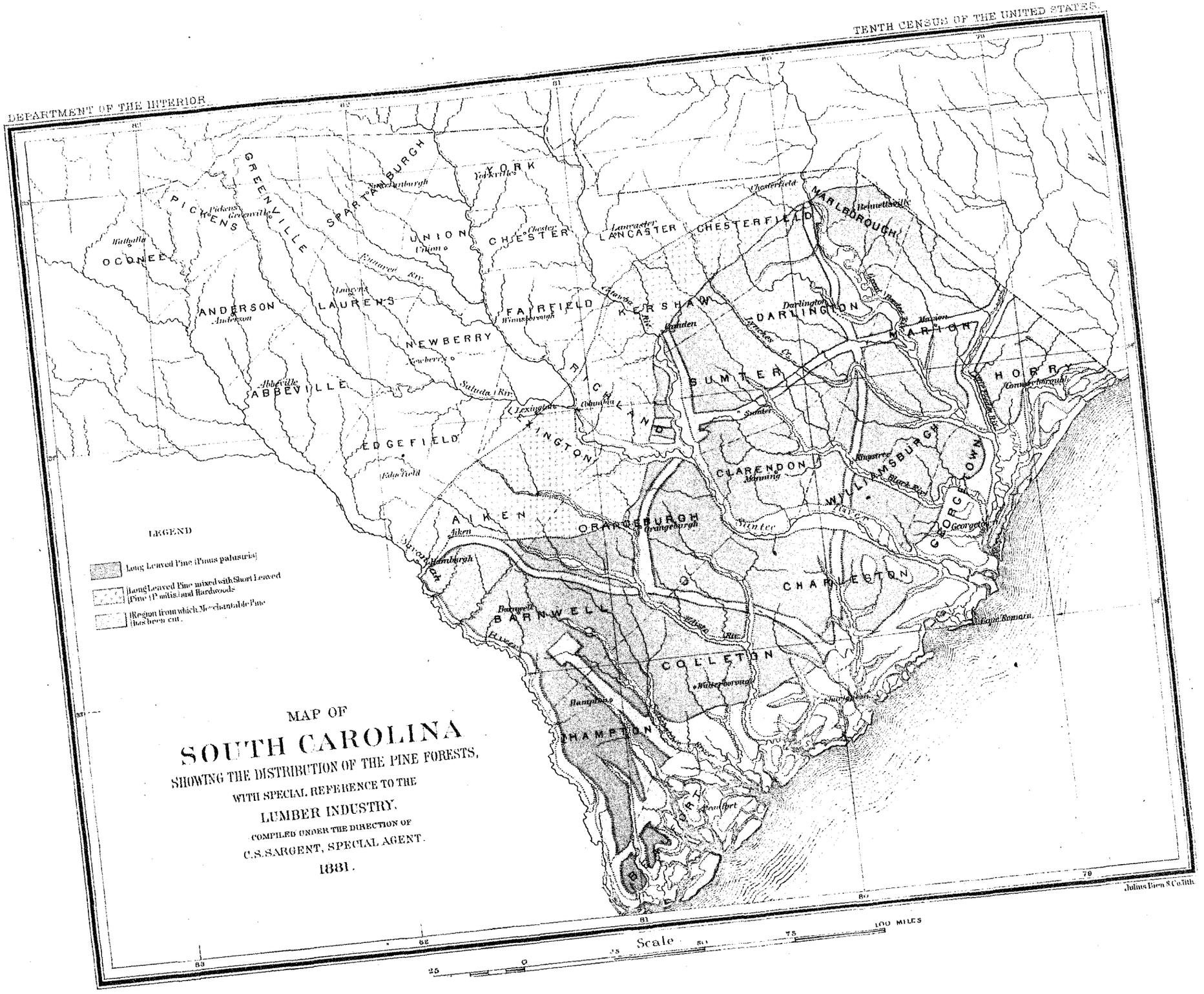
The pine belt of the coast, in South Carolina as well as through its entire extent from Virginia to Texas, suffers from fires set every spring by grazers for the purpose of improving the scanty herbage growing among the trees of this open forest. These fires run rapidly over the surface stripped by the fires of previous years of any accumulation of vegetable material, without inflicting any immediate injury upon the old trees of the forest unless a turpentine orchard is encountered, when, the resinous surfaces of the boxes being once fully ignited, nothing can save the trees from total destruction. If the mature trees of the forest are not under normal conditions greatly injured, however, by this annual burning of the dead herbage beneath them, the forest itself, as a whole, suffers enormously from this cause. Slight and short-lived as these fires are, they destroy the vegetable mold upon the surface of the ground, all seeds and seedling trees, and all shrubbery or undergrowth, which, in protecting the germination of seeds, insures the continuation of the forest. They deprive the soil of fertility and make it every year less able to support a crop of trees, and in thus robbing the soil they influence largely the composition of succeeding crops. Few young pines are springing up anywhere in the coast region to replace the trees destroyed, but where seedlings protected from fire appear upon land long subjected to annual burning, they are usually, although not universally, of less valuable species, and not the long-leaved pine which gives to this forest its principal economic importance. These annual fires are slowly but surely destroying the value of the Southern Pine Belt. They destroy all seeds and seedling trees, the fertility of the soil, and its power to produce again valuable species.


LAKE PONTCHARTRAIN
CHANDELEUR
G U L F O F M E
LEGEND.
I Under 1 cord per acre
II From 1 to 2 " " "
III " 2 " 5 " " "
IV " 5 " 10 " " "
V " 10 " 20 " " "
" 20 " 50 " " "
Over 50 " " "
DENSITY OF FORESTS
COMPILED UNDER THE DIRECTION OF
C. S. SARGENT, SPECIAL AGENT
1883.
Scale



ALABAMA, MISSISSIPPI, LOUISIANA

Julius Bien & Co. lith.


PICKENS
GREENVILLE
SPARTANBURG
YORK
OCONEE
ANDERSON
LAURENS
UNION
CHESTER
LANCASTER
CHESTERFIELD
MARLBOROUGH
NEWBERRY
FAIRFIELD
KERSHAW
DARLINGTON
MARION
HORRY
ABBEVILLE
EDGEFIELD
RICHLAND
SUMTER
CLARENDON
WILLIAMSBURG
GEORGETOWN
LEXINGTON
AIKEN
ORANGEBURG
CHARLESTON
BARNWELL
COLLETON
BEAUFORT
HAMPTON
LEGEND
Long Leaved Pine (Pinus palustris)
Long Leaved Pine mixed with Short Leaved Pine (P. mitis) and Hardwoods
Region from which Merchantable Pine has been cut.
MAP OF
SOUTH CAROLINA
SHOWING THE DISTRIBUTION OF THE PINE FORESTS,
WITH SPECIAL REFERENCE TO THE
LUMBER INDUSTRY.
COMPILED UNDER THE DIRECTION OF
C.S.SARGENT, SPECIAL AGENT.
1881.
Scale
100 MILES
Julius Bien & Co lith.

The following estimates of the amount of long-leaved pine standing in the state were made up from information obtained from Mr. Edward Kidder, of Wilmington, North Carolina, in regard to that part of the state north of the Edisto river, and from Mr. W. G. Norwood, of Blackshear, Georgia, for the southern part of the state. They are based on what is believed to be less accurate information respecting the northern part of the state than has been obtained in regard to the pine forests of the other states, and allowance should be made for possible large errors. The estimates are, however, probably largely below the actual productive capacity of the pine forests of the state which may be expected to exceed by 25 or 30 per cent. the following figures:

LONG-LEAVED PINE (*Pinus palustris*).

Counties.	Feet, board measure.	Counties.	Feet, board measure.
Aiken	209, 000, 000	Kershaw	171, 000, 000
Barnwell	340, 000, 000	Lancaster	5, 000, 000
Beaufort	49, 000, 000	Lexington	76, 000, 000
Charleston	458, 000, 000	Marion	326, 000, 000
Chesterfield	183, 000, 000	Marlborough	191, 000, 000
Clarendon	332, 000, 000	Orangeburgh	465, 000, 000
Colleton	453, 000, 000	Richland	88, 000, 000
Darlington	337, 000, 000	Sumter	380, 000, 000
Fairfield	7, 000, 000	Williamsburgh	536, 000, 000
Georgetown	128, 000, 000	Total	5, 316, 000, 000
Hampton	202, 000, 000		
Horry	380, 000, 000	Cut for the census year ending May 31, 1880	124, 492, 000

The principal centers of lumber manufacture are Georgetown, Charleston, and various points in Hampton and Barnwell counties, where small railroad mills are located. Charleston and Georgetown are the distributing centers for naval stores manufactured in the state.

GEORGIA.

The northern counties of Georgia are covered with the forests of the Alleghany Mountain region, here and in northern Alabama reaching the southern limits of their distribution and considerably reduced in the number of species composing them, the pines, firs, beeches, and other northern trees being generally replaced by the broad-leaved species of the Mississippi basin. From the base of the mountains forests of oak mixed with pines extend southward, occupying the central portion of the state and mingling with the trees of the Maritime Pine Belt along its northern limits. In the southern and coast counties great areas of swamps are still covered with forests of cypress, protected by their inaccessibility from the attacks of the lumberman.

The merchantable pine in the immediate vicinity of the principal streams and along the lines of railroad has been removed, and serious damage has been inflicted upon the pine forests of the state by the reckless manufacture of naval stores. Vast areas covered with pine, however, still remain, while the hard-wood forests of the central and northern portions of the state contain a large quantity of the most valuable hard woods.

The manufacture of cooperage stock is still in its infancy, and this and other industries requiring an abundant and cheap supply of hard wood seem destined soon to reach an enormous development in the upper districts of Georgia and the other states of the south Atlantic division.

During the census year 705,351 acres of woodland were reported devastated by fire, with a loss of $167,620. The greatest number of these fires was traced to carelessness in clearing land, to sparks from locomotives, and to hunters.

The following estimates of the amount of long-leaved pine standing in the state of Georgia May 31, 1880, were prepared by Mr. W. G. Norwood, of Blackshear, in that state, a timber viewer and expert of high standing. He obtained his results by dividing the whole pine belt into irregular regions over which the average cut per acre could be obtained, allowance being made for clearings, farms, areas of culled forests, streams, swamps, etc. The area in each of these regions, by counties, was measured upon a large-scale map and the standing timber computed. These estimates include merchantable pine still standing on land partly cut over, or which has been worked in the manufacture of turpentine. The boxed areas include nearly all the regions from which any pine has been removed, and extend beyond them in all directions into the uncut forests and along rivers and railroads.

Similar methods, practically, were adopted in preparing the estimates of the amount of pine standing in Florida and the other Gulf states. The results thus obtained are not, of course, strictly accurate, and are not supposed to be so. The estimates are intended to show the average productive capacity of the pine forests over large areas, and to indicate generally in what part of the state the principal bodies of pine still occur. Liberal allowance has been made in computing areas of swamp and cleared land, and it will probably be safe to add 10 per cent. to these estimates of the pine standing in any of the southern states.

The following is an estimate of the amount of pine timber standing in the state May 31, 1880:

LONG-LEAVED PINE (*Pinus palustris*).

Counties.	Feet, board measure.	Counties.	Feet, board measure.	Counties.	Feet, board measure.
Appling	543,000,000	Floyd	19,000,000	Polk	36,000,000
Baker	134,000,000	Glascock	17,000,000	Pulaski	408,000,000
Baldwin	35,000,000	Glynn	47,000,000	Randolph	126,000,000
Berrien	410,000,000	Hancock	76,000,000	Richmond	21,000,000
Bibb	38,000,000	Haralson	21,000,000	Schley	28,000,000
Brooks	281,000,000	Harris	22,000,000	Screven	188,000,000
Bryan	60,000,000	Houston	191,000,000	Sumter	191,000,000
Bulloch	733,000,000	Irwin	488,000,000	Talbot	44,000,000
Burke	293,000,000	Jefferson	206,000,000	Tattnall	768,000,000
Calhoun	117,000,000	Johnson	291,000,000	Taylor	53,000,000
Camden	82,000,000	Jones	40,000,000	Telfair	598,000,000
Charlton	246,000,000	Laurens	1,064,000,000	Terrell	104,000,000
Clay	96,000,000	Lee	128,000,000	Thomas	311,000,000
Clinch	350,000,000	Liberty	236,000,000	Twiggs	84,000,000
Coffee	578,000,000	Lowndes	236,000,000	Upson	32,000,000
Colquitt	339,000,000	McDuffie	10,000,000	Ware	161,000,000
Crawford	45,000,000	McIntosh	65,000,000	Warren	80,000,000
Decatur	653,000,000	Macon	52,000,000	Washington	240,000,000
Dodge	417,000,000	Miller	164,000,000	Wayne	160,000,000
Dooly	334,000,000	Mitchell	379,000,000	Webster	48,000,000
Dougherty	90,000,000	Monroe	18,000,000	Wilcox	292,000,000
Early	299,000,000	Montgomery	701,000,000	Wilkinson	152,000,000
Echols	183,000,000	Muscogee	35,000,000	Worth	512,000,000
Effingham	6,000,000	Paulding	2,000,000	Total	16,778,000,000
Emanuel	956,000,000	Pierce	220,000,000		
Cut for the census year ending May 31, 1880 (excluding 28,335,000 feet cut in the region of short-leaved pine and mixed growth).					272,743,000

The principal centers of lumber manufacture are situated along the coast at Brunswick, Darien, Savannah, and Saint Mary's. Logs sawed at these points are now driven down the various streams for a considerable distance from the coast. Large quantities of pine lumber are also manufactured in different mills located along the lines of railroad in Appling, Polk, Floyd, and other pine counties. Savannah and Brunswick are the principal points of distribution of the naval stores manufactured in the state.

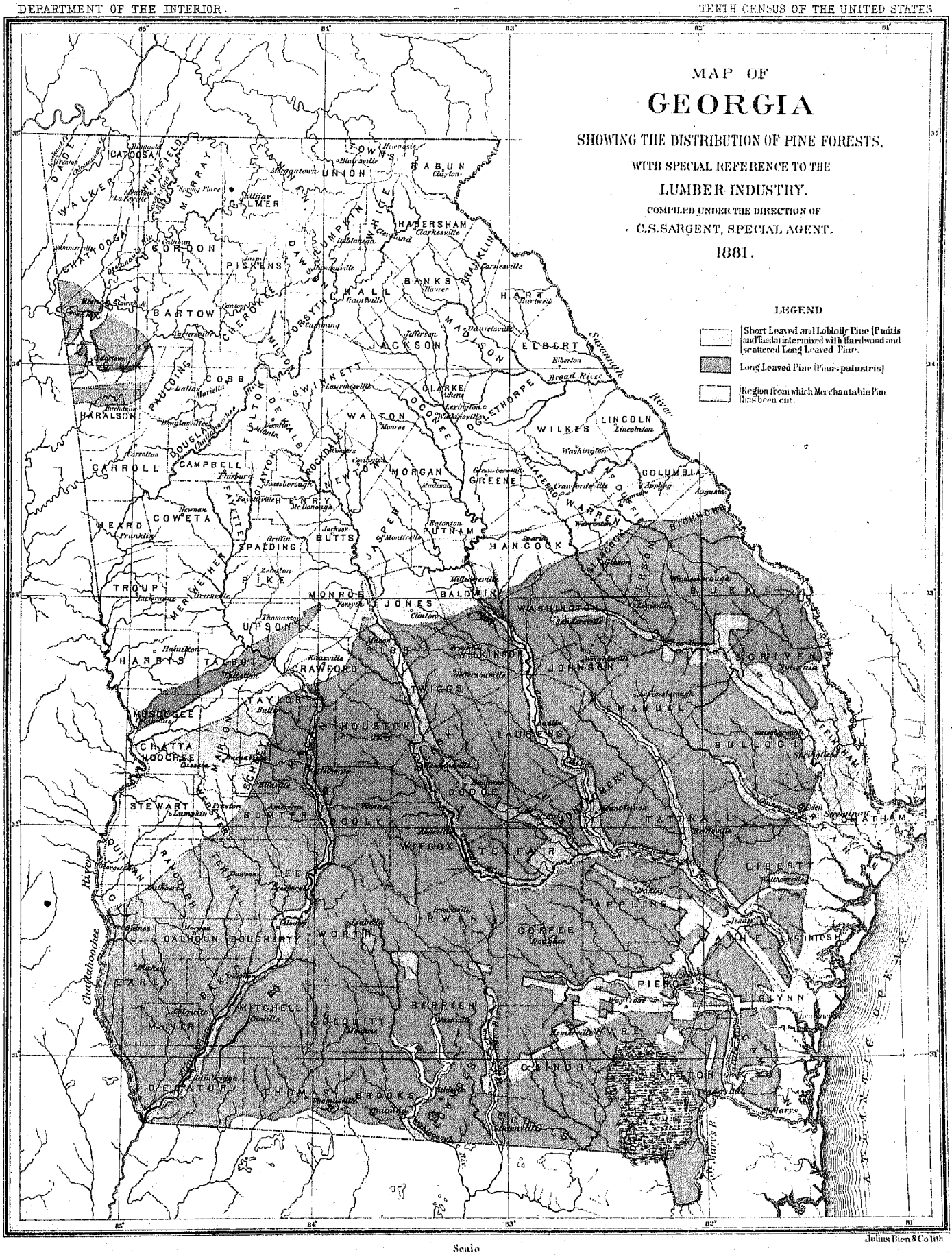
FLORIDA.

The forests of the Southern Pine Belt cover the state as far south as cape Malabar and Charlotte harbor. The long-leaved pine is replaced along the sandy dunes and islands of the coast by oaks (of which the live oak is alone of commercial importance), scrub pines, and palmettos, while a deciduous forest, largely of northern composition, occupies the high, rolling lands in a large part of Gadsden, Leon, Jefferson, and Madison counties. The pine forests gradually decrease southward in density and value, and south of latitude 29° N. are of little present commercial value. Forests of pitch pine (*Pinus Cubensis*), however, extend far south of the region occupied by the more valuable long-leaved pine bordering the coast and covering the low ridges of the Everglades. Great areas of swamp occur everywhere through northern and central Florida, covered with forests of cypress, red cedar, gum, and bordered with bays, magnolias, and other broad-leaved evergreens; while the hummocks or low elevations, covered with rich soil and everywhere common, bear oaks and other deciduous trees, often of great size.

South of cape Malabar and Tampa bay the character of the vegetation changes, and the North American arborescent species are replaced by the semi-tropical trees of the West Indies. These occupy a narrow strip along the coast, cover the keys and reefs, and spread over some of the hummocks of the Everglades. This semi-tropical forest is confined to the saline shores of the innumerable bays and creeks of the region, or to the coral and sedimentary calcareous formation of the keys and hummocks. The species of which it is composed are here at the northern limits of their range; individual trees are comparatively small and the forests of the southern extremity of the Florida peninsula are commercially unimportant, although sufficiently extensive and varied to supply the scanty population of this region with lumber, fuel, and material for boat-building and the manufacture of fishing apparatus.

The forests of Florida have not suffered greatly from fire. Much of the state is uninhabited and unfit for agriculture or grazing. The danger, therefore, of fires set in clearing land for farms spreading to the forest is less than in other parts of the south, while the numerous streams and swamps everywhere intersecting the pine forests and the natural dryness of the sandy ridges, thinly covered with vegetable mold, check the spread of fires when started.

During the census year 105,320 acres of woodland were reported as burned over, with an estimated loss of $69,900. The largest number of these fires was set by grazers to improve the pasturage for their stock.


MAP OF
GEORGIA
SHOWING THE DISTRIBUTION OF PINE FORESTS,
WITH SPECIAL REFERENCE TO THE
LUMBER INDUSTRY.
COMPILED UNDER THE DIRECTION OF
C.S.SARGENT, SPECIAL AGENT.
1881.
LEGEND
Short Leaved and Loblolly Pine (Pinus and Taeda) intermixed with Hardwood and scattered Long Leaved Pine.
Long Leaved Pine (Pinus palustris)
Region from which Merchantable Pine has been cut.
Scale
25 0 25 50 75 100 MILES
Julius Bien & Co lith.

The following estimates, by counties, of the long-leaved pine still standing in Florida east of the Apalachicola river were prepared by Mr. A. H. Curtiss, of Jacksonville; those for west Florida by Dr. Charles Mohr, of Mobile, Alabama:

LONG-LEAVED PINE (*Pinus palustris*).

Counties.	Feet, board measure.	Counties.	Feet, board measure.	Counties.	Feet, board measure.
Alachua	525, 000, 000	Holmes	150, 000, 000	Putnam	121, 000, 000
Baker	144, 000, 000	Jackson	233, 000, 000	Saint John's	66, 000, 000
Bradford	138, 000, 000	Jefferson	23, 000, 000	Santa Rosa	213, 000, 000
Brevard	63, 000, 000	Lafayette	425, 000, 000	Sumter	103, 000, 000
Calhoun	81, 000, 000	Levy	346, 000, 000	Suwannee	622, 000, 000
Clay	77, 000, 000	Liberty	75, 000, 000	Taylor	213, 000, 000
Columbia	455, 000, 000	Madison	122, 000, 000	Volusia	59, 000, 000
Duval	67, 000, 000	Manatee	200, 000, 000	Wakulla	72, 000, 000
Escambia	90, 000, 000	Marion	315, 000, 000	Walton	409, 000, 000
Hamilton	311, 000, 000	Nassau	104, 000, 000	Washington	187, 000; 000
Hernando	142, 000, 000	Orange	87, 000, 000	Total	6, 615, 000, 000
Hillsborough	162, 000, 000	Polk	210, 000, 000		
Cut for the census year ending May 31, 1881 (excluding 77,500,000 feet, estimated, grown in Alabama and sawed in western Florida).					203, 054, 000

In this estimate no account is made of timber remaining on lands which have been cut over, or of that injured by the manufacture of turpentine.

The principal centers of lumber manufacture are Pensacola, Millview, and Blackwater, in Escambia and Santa Rosa counties. The logs sawed here and at other points upon Pensacola bay are driven down the streams from the forests of Alabama, the accessible pine in this part of Florida having been long exhausted. A large amount of pine lumber is also manufactured at Ellaville, in Madison county, upon the upper Suwannee river, and at Jacksonville, Saint Mary's, and at various points upon the lower Saint John river. Logs driven from the lower Suwannee river are sawed at Cedar Keys, where are situated the most important mills in the United States devoted to the manufacture of red cedar into pencil stuff.

Jacksonville, Saint Mary's, and Fernandina are the largest centers of distribution for the naval stores manufactured in the state.

The following extracts are taken from Mr. Curtiss' report upon the forests of Florida:

"In visiting western Florida I have had particularly in view the examination of the timber of a part of the state which is unlike all others in physical conformation, and consequently in vegetation. This region differs but little from the country bordering the southern Alleghanies, and may perhaps be regarded as the southern terminus of the Appalachian range. It commences about 40 miles north of the Gulf of Mexico, and extends northward between the Chipola and Okalokonee rivers into southwestern Georgia and southeastern Alabama. North of this there is little to connect it with the southern mountains except the rugged banks of the Chattahoochee river. The surface is undulating, hilly, often precipitous. The soil, like that of the Piedmont region of Virginia and Carolina, abounds in red clay, and is therefore adapted to crops which do not succeed in other portions of Florida. The vegetation is extremely varied and interesting, comprising most of the plants of northeastern Florida, a large portion of those found in the Piedmont country and in the rich river bottoms of the interior, and a considerable number found only on the limestone with which much of this country is underlaid. In the river bottoms, which are inundated at seasons, there is found a great variety of trees, some of which attain a size probably not equaled elsewhere. In this small portion of the state of Florida is to be found nearly every species of tree growing within the limits of the state, except those semi-tropical species found on the coast south of Cedar Keys and Mosquito inlet. Fully fifty American arborescent species here reach their southern limit. A few species show marked diminution in size, and all northern species which extend southward of this Chattahoochee region here attain in Florida their largest dimensions.

"There are two trees in this region of particular interest, as they are not known to grow anywhere else; these are the stinking cedar (*Torreya taxifolia*) and the yew (*Taxus Floridana*). There is reason to believe that the *Torreya* occurs also along the Wakulla river, and perhaps elsewhere in the state, but there is no positive knowledge of its occurrence except along the Apalachicola river, on the limestone hills which border it at intervals on the east

"The forests of this region are still almost intact. Some poplar and tulip wood is cut from the river banks for northern markets, but the valuable timber on these rich shores is as yet almost untouched. The country southwest of this region, though of very little agricultural value, contains an immense quantity of the best cypress timber, hardly yet disturbed by the lumberman.

"Two mills have recently been established at Apalachicola, one of which saws nothing but cypress lumber. The product of this mill is sent to New Orleans. As white-pine lumber must soon become scarce, the attention of dealers ought to be directed to southern cypress, which will prove a good substitute for it. Although there is plenty of valuable pine in this country the swamps render it somewhat inaccessible, and the mills at Apalachicola

are more easily supplied with logs rafted down the river from Georgia. Many hewed logs of large dimensions are shipped from this point. The country near Apalachicola in surface and timber growth is much like that of northeastern Florida, all the good timber having been cut.

"PENCIL CEDAR.

"The favorite variety of red cedar, of tall and straight growth, is becoming scarce, but there remains a large quantity of quality sufficiently good for pencils in nearly all sections of the state north of a line drawn from cape Canaveral to the north end of Charlotte harbor. There is no red cedar in southern Florida, the Dixon mill at Tampa having exhausted the supply within reach of that place; but new mills have been established near Webster, in Sumter county, and at the head of Crystal river, at present the best source of supply.

"CYPRESS.

"The main body of cypress in southern Florida is located in the 'Big Cypress', a region of which I have heard much from persons who were in an expedition which went through it during the last Indian war. They entered it at the 'Little Palm hummock', 18 miles northeast of cape Romano. Traveling east about 12 miles they came to the 'Big Palm hummock', when they turned and traveled nearly due north for six days, averaging 12 miles a day. Their guide then informed them that the cypress extended 12 miles farther north; so it would seem that the main body of the 'Big Cypress' has a length of about 85 miles and a width, as they think, of about 20 miles. The cypress grows in belts running north and south, the main central belt being about 6 miles wide and consisting of large timber. There are narrow strips of cypress and pine alternating with prairie, although probably two-thirds of the whole region is covered with cypress. According to these estimates there must be at least 1,000 square miles covered with cypress timber in this region, which in times of high water could be floated out by the numerous creeks and inlets flowing toward the Gulf. There are also large quantities of heavy cypress on the swampy borders of Peace creek, the Hillsborough river, the Withlacoochee, etc., many trees squaring from 2 to 4 feet.

"The long-leaved pine extends south to Prairie creek, in about latitude 27° N. The pine between Prairie and Peace creeks, which is sawed at the mill near Ogden, belongs to this species. Timber in this region is quite shaky, and from all reports it is evident that the yellow pine in Manatee, Orange, and Hillsborough counties is quite inferior, being mostly of the rough-barked, sappy variety called in this region bastard pine. The long-leaved pine occupies nearly the whole of the interior of the peninsula north of a line drawn from Charlotte harbor to cape Malabar. At its southern limit I saw trees which measured over 2 feet in diameter and which would furnish logs 30 feet long.

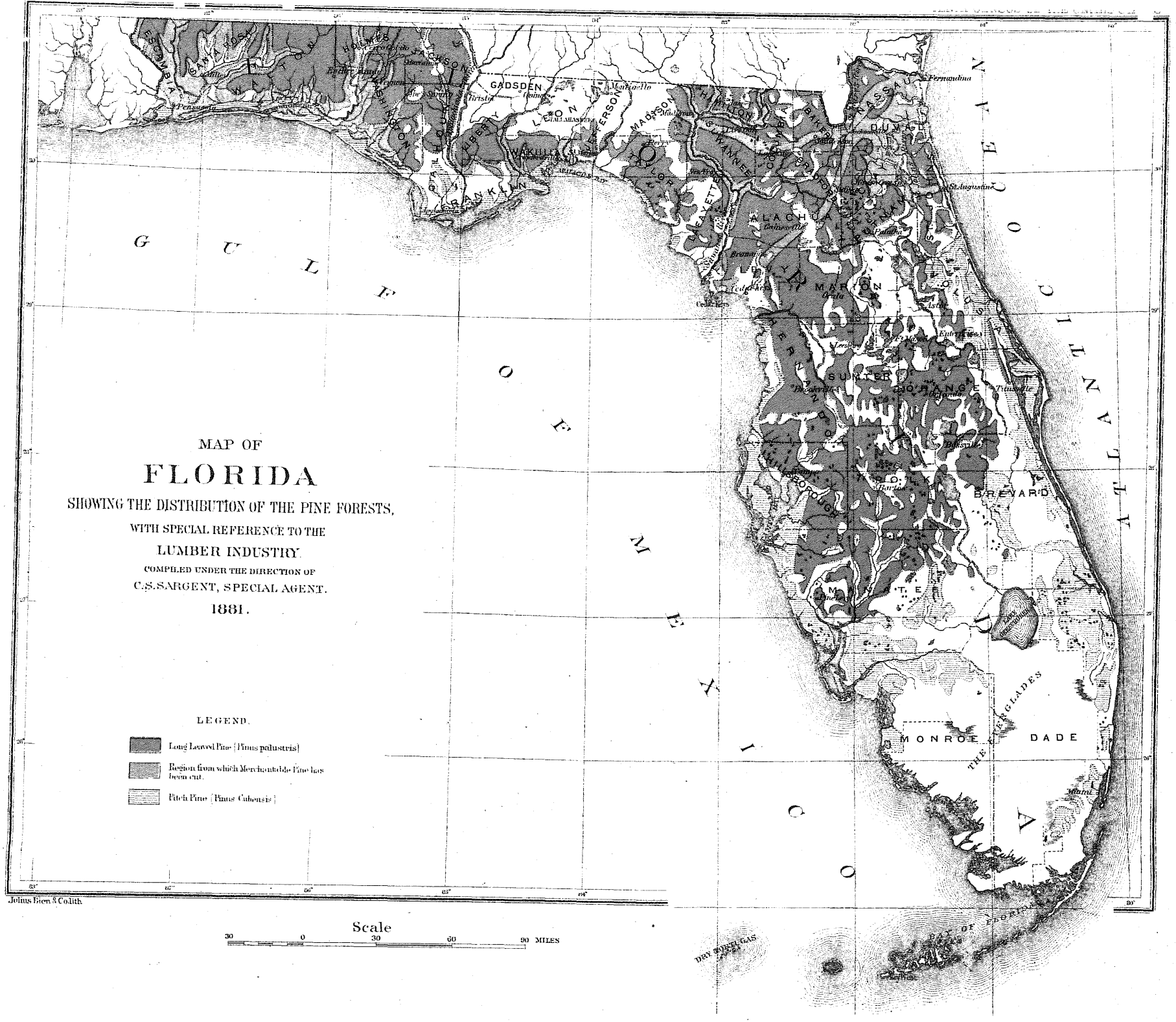
"Pitch pine (*Pinus Cubensis*) appears on the west coast at Margo, 10 miles north of cape Romano, and extends northward to Prairie and Fishhead creeks, being the only pine of this region. From Charlotte harbor northward it is confined to a belt from 10 to 15 miles wide, bordering the Gulf, extending to Tampa and as far northward as Pensacola, being also scattered through the interior. This tree seldom exceeds 2 feet in diameter or 50 feet in height, and will afford a great quantity of framing timber, although it will be probably generally used in the production of naval stores, for which it is nearly or quite equal to the long-leaved pine.

"One of the most important facts in regard to the pine forests of Florida is their permanence. Owing to the sterility of soil and the liability to inundation of most of the state, it is certain that but a very small portion of Florida will ever be cleared of its forest covering. Taking into consideration the great area covered with valuable pine forests, and the fact that there will be a continuous new growth if the spread of forest fires can be checked, only trees of the largest size being cut, it is evident that Florida will furnish a perpetual supply of the most valuable pine lumber."

The following notes upon the pine forests of western Florida were furnished by Dr. Charles Mohr, of Mobile, Alabama:

"The pine forests occupying the region between the valley of the Apalachicola river and the banks of the Choctawhatchee, and from the headwaters of the Chipola to the bay of Saint Andrew's, are yet mostly in their primeval condition and contain a vast body of valuable timber. The district between the Choctawhatchee and the Perdido is the seat of the oldest and most active lumbering industry of the whole Gulf coast. The numerous streams flowing through the pine forests of eastern Alabama to the large bays upon the coast of western Florida make fully 4,000 square miles of southeastern Alabama comparatively accessible and tributary to the region from which the lumber finds an outlet by way of the bay of Pensacola.

"The better class of the somewhat elevated and undulating timber-lands which surround Escambia, Blackwater, and Saint Mary de Galves bay were long since stripped of their valuable timber. These forests having been culled time after time during the last quarter of a century, are now completely exhausted. The low, wet pine barrens, with their soil of almost pure sand, which trend eastward along the shores of Santa Rosa sound and Choctawhatchee bay, have never borne a growth of pine sufficiently large to furnish more than a small supply of timber of very inferior quality. The ridges between the Choctawhatchee river and the Yellow river are also, for the most part, arid, sandy wastes, never yielding more than a few hundred feet of lumber per acre.


MAP OF
FLORIDA
SHOWING THE DISTRIBUTION OF THE PINE FORESTS,
WITH SPECIAL REFERENCE TO THE
LUMBER INDUSTRY.
COMPILED UNDER THE DIRECTION OF
C.S.SARGENT, SPECIAL AGENT.
1881.
LEGEND.
Long Leaved Pine {Pinus palustris}
Region from which Merchantable Pine has been cut.
Pitch Pine {Pinus Cubensis}
Julius Bien & Co lith.
Scale
30 0 30 60 90 MILES
GULF OF MEXICO
ATLANTIC OCEAN
GADSDEN
WAKULLA
FRANKLIN
LEON
JEFFERSON
MADISON
HAMILTON
SUWANNEE
COLUMBIA
BAKER
DUVAL
NASSAU
ALACHUA
PUTNAM
MARION
SUMTER
ORANGE
BREVARD
MONROE
DADE
THE EVERGLADES
DRY TORTUGAS

"The well-timbered portion of west Florida commences with the southern border of Holmes county. This region is now, however, nearly exhausted along water-courses large enough for rafting, while of late years canals and ditches dug into the forest afford facilities for floating timber growing remote from streams to the mills. According to those best informed regarding the amount of timber still standing in this section, there is scarcely enough left between the Escambia and Choctawhatchee rivers, in western Florida, to keep the mills on the coast supplied for another half-dozen years, even if the whole of the pine standing could be made available.

"The lumber business of Perdido bay is entirely concentrated at Millview, where three large saw-mills are established. The production of lumber commenced here in 1865, increasing rapidly from 10,000,000 feet, board measure, in that year, to three and four times that amount. All the lumber manufactured upon Perdido bay is sent to Pensacola by a railroad constructed for the purpose. Only about 400 pieces of hewed timber are shipped from Millview, although the railroad has carried an average of 37,000,000 feet of lumber annually to Pensacola, the maximum annual yield of the Millview mills having been 45,000,000 feet.

"Pensacola is the most important port of lumber export on the Gulf coast. During the year ending August 30, 1879, 403 vessels, of a combined capacity of 217,487 tons, carried from the harbor of Pensacola 3,090,469 cubic feet of hewed square timber, 3,769,527 cubic feet of sawed square timber, and 60,000,000 feet of sawed lumber, board measure. Of the squared timber four-fifths is shipped to Great Britain.

"The peninsula between the junction of the Escambia and the bay of Saint Mary de Galves is low, and, along the shore-line, bordered with marshes. The timber needed to supply the mills located upon the shores of these waters has during the past forty years been drawn from this region, and when new forests have replaced the original growth they have been cut over and over again, and still furnish a small amount of timber, as the turpentine-distiller has not followed the log-getter in these regions. The supply of timber here, however, at present is too small to be taken into account in view of the enormously increased demands of the mills. There are three large mills on Blackwater bay producing 40,000,000 feet of lumber a year. Three-fourths of this lumber is produced in the establishment of Messrs. Simpson & Co., near the mouth of the Blackwater river, at Bagdad, about half a mile below Milton. Mills sawing square timber are situated 20 or 30 miles above the mouth of the Blackwater and use mostly water-power. The mill of Messrs. Milligan, Chaffin & Co., on this river, 20 miles above Milton, sends 28,000 pieces of square sawed timber to Pensacola, averaging 32 cubic feet each; 5,000 such pieces are furnished by a few very small water-mills higher up, swelling the whole amount of square timber to 33,000 pieces. The last-named firm has acquired by purchase large tracts of public land along Black and Coldwater rivers. To reach the timber growing on their land a canal 20 miles long, with sluices that intersect the small tributaries of these streams, has been dug. By means of this canal a sufficient supply of logs is secured to keep the mill running through the year. The large manufacturers of Bagdad have adopted a similar system, and by these means, and by the construction of tramways tapping the more remote and isolated regions tributary to the waters of Black and Yellowwater rivers toward the northern part of the state, the exhaustion of the timber-lands through the whole breadth of western Florida, as far as the banks of the Choctawhatchee river, will certainly be accomplished before the end of the next five years. A sash, door, and blind factory located at Bagdad consumes a large amount of cypress lumber. This is procured from the mills situated along the shores of the upper Choctawhatchee bay, and is grown along the banks of the Choctawhatchee river. The cypress lumber is exclusively used in the manufacture of sashes, blinds, doors, moldings, and particularly in the construction of houses, of which every year a considerable number is shipped by the way of New Orleans to the treeless regions of western Louisiana and Texas. This establishment manufactures a large amount of fencing, the rails of cypress, the posts of red and white cedar, rounded and capped. This is shipped to New Orleans and to the settlements in southern Florida. Of late years it has commenced sawing pencil-boards of red cedar. The logs, of very superior quality, are obtained from the hummocks and bottom lands bordering upon the Choctawhatchee. The lumber for this purpose must be entirely free from knots, of even, close grain, the woody fibers perfectly straight. These logs are cut in sections 6 inches in length, and the carefully-selected pieces sawed into slabs 2 inches broad and a quarter of an inch in thickness. Fifty gross of these slabs are packed in a case, and the establishment produces about six hundred cases annually. These are mostly shipped to a pencil factory in Jersey City, a small number going also to Germany.

"The saw-mills situated on the shores of Choctawhatchee bay extend from the mouth of Alaqua creek to Freeport, and westward to Point Washington; the logs sawed at these mills are for the most part brought down by raft from the upper waters of the Choctawhatchee and its tributaries. The lumber sawed here is mostly long-leaved pine, with a small amount of cypress. The product of these mills is mostly shipped to New Orleans in small schooners carrying from 15,000 to 20,000 feet each. The capacity of the mills upon this bay is in excess of their production, the difficulty of obtaining logs causing most of them to remain shut during half the year.

"The causes which up to the present time have prevented the destruction of the pine forests about Saint Andrew's bay, which is traversed by one fine river and bordered by another, must be traced to the difficulty of navigating these streams and to the want of a convenient outlet to the Gulf at Apalachicola. There are few saw-mills upon this bay, supplying only the local demand, and even these are furnished with logs floated down the Chattahoochee from beyond the confines of the state."